On the taxonomic system of Eurasian Pamphagidae (Orthoptera: Caelifera)

ZHANG Dao-Chuan[1,2], YIN Hong[2], YIN Xiang-Chu[1,2]

(1. Northwest Plateau Institute of Biology, Chinese Academy of Sciences, Xining 810001, China;
2. College of Life Sciences, Hebei University, Baoding, Hebei 071002, China)

Abstract: This paper provides a new taxonomic system for the Eurasian Pamphagidae, in which the 47 known genera are divided into 6 subfamilies including 4 new subfamilies: Prionotropisinae nov., Thrinchinae, Pamphaginae, Tropidaucheninae nov., Nocarodesinae nov., Orchaminae nov.

Key words: Pamphagidae; new subfamily; Eurasia

The Pamphagidae are distributed over Africa, Europe and Asia. The problem of developing a taxonomic system for this group has been extensively studied by some taxonomists (Bei-Bienko *et al*., 1951; Chopard, 1951; Descamps *et al*., 1972; Dirsh, 1961, 1965, 1975; Harz, 1975; Kirby, 1914; Otte, 1994; Willemse, 1984, 1985; Xia, 1958; Xia *et al*., 1994; Yin, 1982, 1984; Yin *et al*., 1996; Zheng, 1985, 1993). Eurasian Pamphagidae have been simply divided into two subfamilies: Pamphaginae, Akicerinae (= Thrinchinae). In this paper, the family with 47 known genera is divided into six, well defined, subfamilies, four of which are new: Prionotropisinae nov., Thrinchinae, Pamphaginae, Tropidaucheninae nov., Nocarodesinae nov., Orchaminae nov.

Main characters used in classification

Antennae filiform or ensiform (Figs. 1 - 2). Middle tibia on dorsal side with or without row of teeth or tubercles (Figs. 3 - 4). Hind tibia with or without apical spine on inner and outer side (Figs. 5 - 6). Tegmina and wings present, oval, lateral, or absent. Tympanum present, often developed or absent (Figs. 7 - 12).

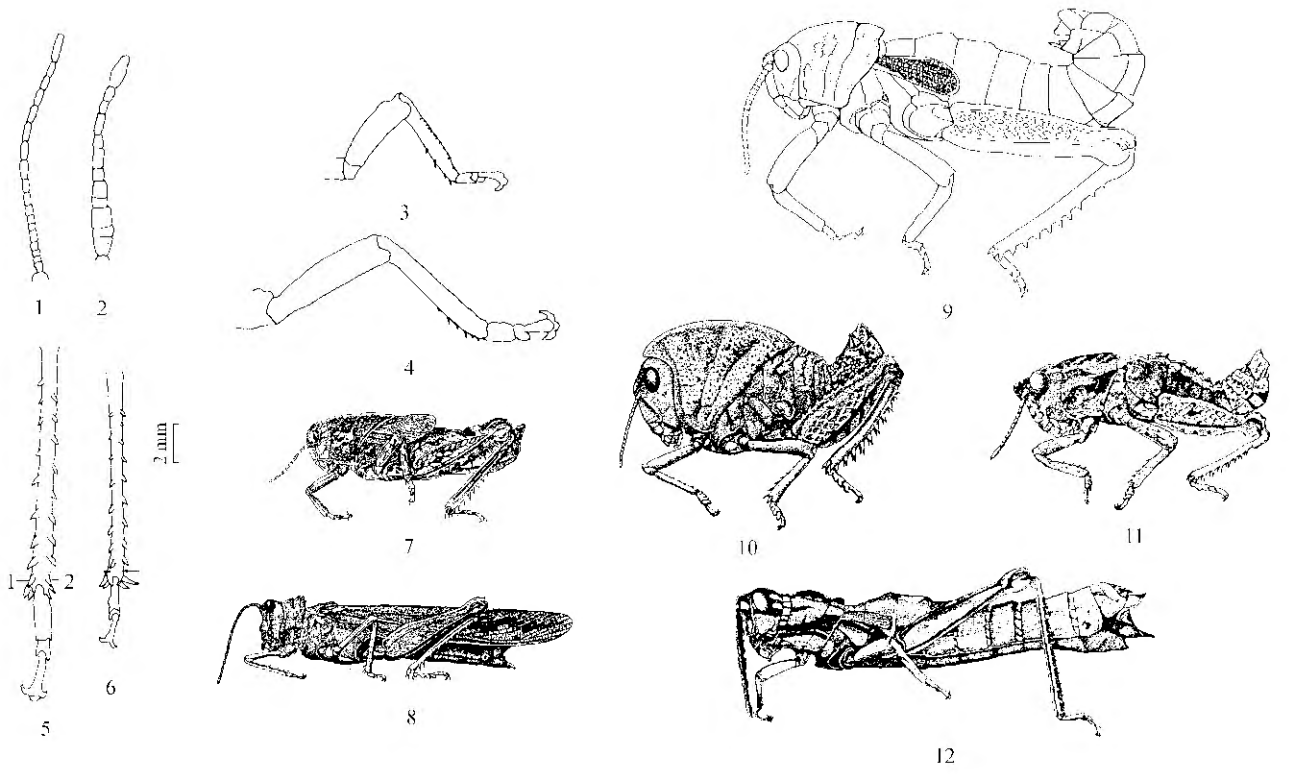
Pamphagidae

Body from large to medium size, often very rough. Head usually with perpendicular frons, making a right or obtuse, broadly rounded angle with vertex, fastigial furrow always present, fastigial foveolae absent, but analogus concavities may present. Antennae filiform, ensiform, or trihedral, 12 - 19 segmented, the apical segment elongated. Dorsum of pronotum crested, tectiform, subcylindrical, or flat. Tegmina and wings fully developed, abbreviated, or entirely absent. Tympanum usually present. Krauss' organ mostly present. Lower basal lobe of hind femur longer than the upper one. Hind tibia with or without apical spine on inner and outer side. Male cercus simple, conical; supra-anal plate angular; subgenital plate short subconical, conical or at apex bilobate. Ovipositor short, with curved valves.

Key to subfamilies of Pamphagidae

1 (10) Antennae filiform.
2 (5) Middle tibia on dorsal side with row of teeth or tubercles.
3 (4) Hind tibia with apical spine on inner and outer side, or at least on the inner side ..... **Prionotropisinae nov.**
4 (3) Hind tibia without apical spine on inner and outer side ..... **Thrinchinae**
5 (2) Middle tibia without teeth or tubercles.
6 (7) Tegmina and wings present, oval, lateral ... **Pamphaginae**
7 (6) Tegmina and wings absent.
8 (9) Tympanum present, often developed ..... **Tropidaucheninae nov.**
9 (8) Tympanum absent ..... **Nocarodesinae nov.**
10 (1) Antennae ensiform ..... **Orchaminae nov.**

基金项目 Foundation item: This work was supported by a grant from the National Natural Science Foundation of China (No. 30130040)
作者简介: 张道川, 男, 1965 年 1 月生, 四川成都人, 博士研究生, 副教授, 主要从事蝗虫系统学研究, E-mail: daochuanzhang@yahoo.com.cn
* 通讯作者 Author for correspondence
收稿日期 Received: 2002-08-20; 接受日期 Accepted: 2002-11-12



Figs. 1 – 12 Main characters of classification

1. *Haplotropis brunneriana Saussure*, ♂, filiform, left antenna from above; 2. *Orchamus raulinii* (Locas, 1854), ♂, ensiform (from Harz, 1975); 3. *Pseudotmethis rubimarginis* Li, ♂, middle tibia viewed from the left; 4. *Haplotropis brunneriana* Saussure, ♂, middle tibia viewed from the left; 5. *Haplotropis brunneriana* Saussure, ♂, hind tibia with tarsus (1-inner apical spine; 2-outer apical spine); 6. *Thrinchus schrenki* W. – W., ♂, hind tibia with tarsus (arrows show the place of absent apical spines) (scale bar = 2 mm). 7. *Prionotropis hystrix* (Germar, 1817), ♂, (from Chopard, 1951); 8. *Thrinchus arenosus* Bei-Bienko, ♀, (from Bei-Bienko, 1951); 9. *Pamphagus elephas* (Linnaeus, 1758), ♂, (from Dirsh, 1965); 10. *Tropidauchen cristatum* Mistsh., ♂, (from Bei-Bienko, 1951); 11. *Nocarodes specialis* Mistsh., ♂, tympanum absent (from Bei-Bienko, 1951); 12. *Orchamus gracilis* (Brunner, 1882), ♀, (from Descamps, 1972).

Subfamily Prionotropisinae nov.

Antennae filiform. Fastigium often broad, frequently without a small ridge along the margin, if bordered by a ridge then often with well-marked foveolae. Median carina of pronotum distinctly incised by posterior transverse groove or sharply depressed in metazona. Tegmina and wings completely developed or abbreviated. Tympanum present. Middle tibia on dorsal side with row of teeth or tubercles. Hind tibia with apical spine on inner and outer side, or at least on the inner side.

Type genus: *Prionotropis* Fieber, 1853. (Fig. 7)

Twenty-one genera of this new subfamily are known in Eurasia: *Asiotmethis* Uvarov, 1943; *Atrichotmethis* Uvarov, 1943; *Beybienkia* Tsyplenkov, 1956; *Eoeotmethis* Zheng, 1985; *Eotmethis* Bei-Bienko, 1949; *Eremocharis* Saussure, 1884; *Eremopeza* Saussure, 1888 (= *Eremoplana* Saussure, 1884); *Eremotmethis* Uvarov, 1943; *Filchnerella* Karny, 1908; *Glyphotmethis* Bei-Bienko, 1951; *Iranotmethis* Uvarov, 1943; *Kanotmethis* Yin, 1995; *Melanotmethis* Uvarov, 1943; *Mongolotmethis* Bei-Bienko, 1949; *Paratmethis* Zheng et He, 1993; *Pezotmethis* Uvarov, 1943; *Prionotropis* Fieber, 1853 (= *Cuculligera* Fischer, 1853); *Pseudotmethis* Bei-Bienko, 1949; *Rhinotmethis* Sjostedt, 1933; *Sinotmethis* Bei-Bienko, 1959; *Tmethis* Fieber, 1853 (= *Eremobia* Serville, 1839).

Subfamily Thrinchinae

Antennae filiform. Frontal ridge in profile roundly projecting forward between antennae. Median carina of pronotum in prozona slightly or considerably raised, often bi- or tri-dentate, in metazona low, linear. Tegmina long, completely or, in the ♀ nearly reaching apex of hind tibia. Tympanum present. Middle tibia on dorsal side with row of teeth or tubercles. Hind tibia without apical spine on inner and outer side.

Subgenital plate in the ♂ with 2 tubercles on apex.

Type genus: *Thrinchus* Fisch. -Waldh., 1883. (Fig. 8)

Two genera of this subfamily are known in Eurasia: *Thrinchus* Fisch. -Waldh., 1883 (= *Thrincus* Saussure, 1884) and *Strumiger* Zubovsky, 1896.

Subfamily Pamphaginae

Antennae filiform. Fastigium not or only slightly projecting, nearly always edged with little ridge, no fastigial foveolae. Pronotum mostly with a regularly arched median keel, not or slightly notched only by sulcus. Tegmina and wings present, oval, lateral. Tympanum present. Middle tibia without teeth or tubercles.

Type genus: *Pamphagus* Thunberg, 1815. (Fig. 9)

Seven genera of this subfamily are distributed in Eurasia: *Euryparyphes* Fischer, 1853 (= *Eunapius* Stål, 1876); *Glyphanus* Fieber, 1853; *Haplotropis* Saussure, 1888 (= *Sulcotropis* Yin *et* Chou, 1979; *Aplusotropis* Saussure, 1887); *Kurtharzia* Kocak, 1982 (*Navasius* Harz, 1975); *Ocneridia* Bolivar, 1913 (= *Ariasa* Bolivar, 1913; *Ariasius* Uvarov, 1939); *Ocnerodes* Brunner, 1881; *Pamphagus* Thunberg, 1815.

Subfamily Tropidaucheninae nov.

Antennae filiform. Fastigium bordered by a little ridge. Foveolae absent. Median carina of pronotum straight or arcute, never intersected by transverse groove. Tegmina and wings absent. Middle tibia in the ♂ without tubercles along the dorsal margin. Hind femur with distinct large pointed spines or with small denticles on dorsal margin. First abdominal tergite with a large tympanic organ.

Type genus: *Tropidauchen* Saussure, 1887. (Fig. 10)

Six genera of this new subfamily are founded in Eurasia: *Eunothrotes* Adelung, 1907; *Oronothrotes* Mistshenko, 1951; *Paranocarodes* Bolivar, 1916 (= *Ananothrodes* Mistshenko, 1951; *Granulodes* Ramme, 1951); *Paranothrotes* Mistshenko, 1951 (= *Pseudonothrotes* Mistshenko, 1951); *Saxetania* Mistshenko, 1951 (= *Afghanacris* Ramme, 1952) and *Tropidauchen* Saussure, 1887.

Subfamily Nocarodesinae nov.

Antennae filiform. Fastigium bordered by a small ridge. No foveolae. Median carina of pronotum straight or arcute, never intersected by the transverse groove. Tegmina and wings absent. Tympanic organ absent. Middle tibia without teeth or tubercles along dorsal margin.

Type genus: *Nocarodes* Fisch. -Waldh., 1846. (Fig. 11)

Seven genera of this new subfamily are distributed in Eurasia: *Araxiana* Mistshenko, 1951; *Bufonocarodes* Mistshenko, 1951; *Iranacris* Mistshenko, 1951; *Nocaracris* Uvarov, 1928; *Nocarodes* Fisch. -Waldh., 1846 (= *Vachushtia* Sugurov, 1912; *Znojkiana* Mistshenko, 1951); *Paranocaracris* Mistshenko, 1951 (= *Granulodes* Ramme, 1951) and *Savalania* Mistshenko, 1951.

Subfamily Orchaminae nov.

Antennae ensiform or subensiform. Tegmina lobiform, lateral, narrow, covering tympanum. Krauss' organ present. Middle tibia without teeth or tubercles. Hind tibia with apical spine on inner and outer side.

Type genus: *Orchamus* Stål, 1876. (Fig. 12)

Four genera of this new subfamily are distributed in Eurasia: *Acaeropa* Uvarov, 1927; *Acinipe* Rambur, 1838 (= *Acocera* Bolivar, 1876); *Eumigus* Bolivar, 1878 and *Orchamus* Stål, 1876.

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欧亚大陆癞蝗科分类系统
(直翅目: 蝗亚目)

张道川[1,2], 印　红[2], 印象初[1,2]

(1. 中国科学院西北高原生物研究所, 西宁　810001; 2. 河北大学生命科学学院, 河北保定　071002)

摘要: 对分布于欧亚大陆的癞蝗科 Pamphagidae 昆虫进行了亚科分类研究, 将已知的 47 个属分为 6 个亚科: 锯癞蝗亚科 Prionotropisinae nov., 蠢蝗亚科 Thrinchinae, 癞蝗亚科 Pamphaginae, 鸣癞蝗亚科 Tropidaucheninae nov., 聋癞蝗亚科 Nocarodesinae nov., 秃癞蝗亚科 Orchaminae nov., 其中包括 4 个新亚科。建立了欧亚大陆癞蝗科新的分类系统。

关键词: 癞蝗科; 新亚科; 欧亚大陆

中图分类号: Q969.26　　**文献标识码**: A　　**文章标号**: 0454-6296 (2003) 02-0218-04